Lewiston Quadrangle, Maine

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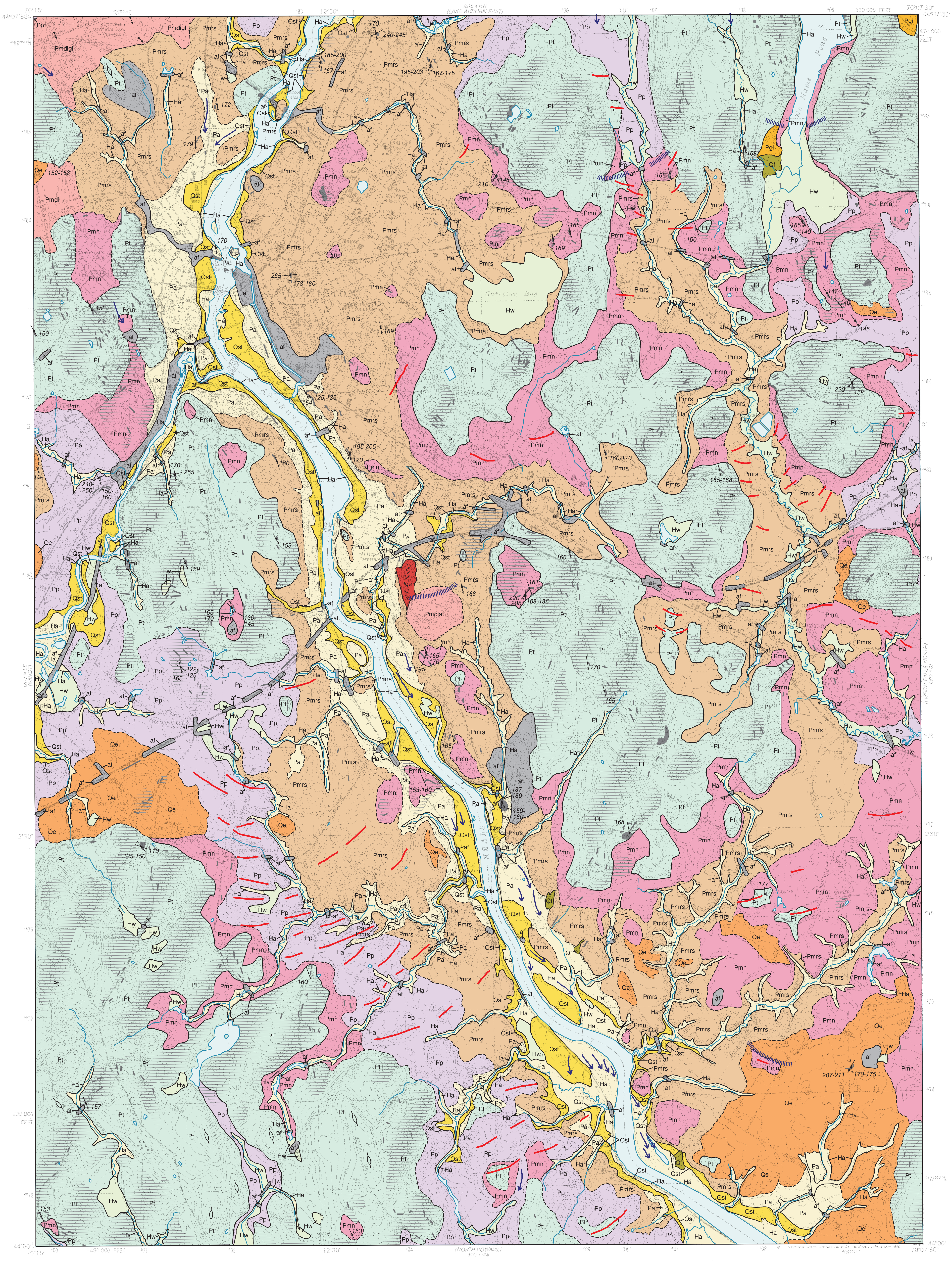
For additional information, see Open-File Report 02-164.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping of the Lewiston quadrangle was conducted by Carol T. Hildreth during the 2001 field season. Funding for this work was provided by the U. S. Geological Survey STATEMAP program and the Maine Geological Survey, Department of Conservation.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Lewiston quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

NOTE: A very thin, discontinuous layer of windblown sand and silt, generally mixed with underlying glacial deposits by frost action and bioturbation, is present near the ground surface over much of the map area but is not shown.

af — **Artificial fill** - Man-made. Material varies from natural sand and gravel to quarry waste to sanitary landfill, including highway and railroad embankments and dredge spoil areas. This material is mapped only where it can be identified using the topographic contour lines or where actually observed. Minor artificial fill is present in virtually all developed areas of the quadrangle. Thickness of fill varies.

Ha — **Stream alluvium** (Holocene) - Sand, silt, gravel, and muck in flood plains along present rivers and streams. As much as 3 m (10 ft) thick. Extent of alluvium indicates most areas flooded in the past that may be subject to future flooding. In places, this unit is indistinguishable from, grades into, or is interbedded with freshwater wetlands deposits (Hw).

Hw — **Freshwater wetland deposit** (Holocene) - Muck, peat, silt, and sand deposited in poorly drained areas. Generally 0.5 to 3 m (1 to 10 ft) thick, but may be much thicker in large bogs. In places, this unit is indistinguishable from, grades into, or is interbedded with stream alluvium (Ha).

Qst — **Stream terrace deposit** (Holocene and Late Pleistocene) - Sand, silt, gravel, and occasional muck on terraces cut into glacial deposits in the Androscoggin River valley. These terraces are the lowest recognizable in the valley and were formed in part during late-glacial time as sea level regressed. They are the lowest fluvial terraces in the quadrangle. From 0.5 to 5 m (1 to 15 ft) thick.

Qe — **Eolian deposit** (Holocene and Late Pleistocene) - Fine- to medium-grained, well-sorted sand. Found as small dunes on a variety of older glacial deposits. Deposited after late-glacial sea level regressed from the area and left many fine-grained marine sediments exposed to wind erosion and transport before vegetation established itself and anchored the deposits. Many more thin dunes are present in the area than are delineated on the map. Thickness varies from 0.5 to 8 m (1 to 25 ft).

Qf — **Alluvial fan deposit** (Holocene and Late Pleistocene) - Small fan-shaped deposits of variably sorted sand, gravel, and mud built by ephemeral or small streams where they emerge from steep slopes onto flat plains or into swamps.

Pa — **Braided stream alluvium** (Late Pleistocene) - Fluvially deposited sand, silt, gravel and occasional muck on terraces (higher than Qst terraces) cut into glacial deposits in the Androscoggin River valley. In places, several succeedingly higher terraces are recognizable within this unit. These terraces formed during late-glacial time as sea level regressed. From 0.5 to 5 m (1 to 15 ft) thick.

Pmrs — **Marine regressive sand deposits** (Pleistocene) - Sand, silt, and minor gravel. Consists of reworked marine delta, outwash, and bottom materials redistributed by marine currents and wave action as sea level fell during late-glacial time. As much as 3 m (10 ft) thick.

Pgi — **Undifferentiated ice-contact deposits** (Pleistocene) - Sand, gravel, and silt. Consists of thin glaciofluvial outwash and/or ice-contact deposits. May include esker or glaciomarine fan deposits. Thickness varies from 0 to 6 m (0 to 20 ft).

Pmn — **Marine nearshore deposits** (Pleistocene) - Sand, gravel, and clay-silt deposited as a result of wave activity in nearshore or shallow marine environments. Includes some beach deposits. In places, coated with unmapped thin dune deposits. Thickness varies from 0.5 to 5 m (1 to 15 feet).

Pmdi — **Glaciomarine ice-contact delta deposits** (Pleistocene) - Composed primarily of sorted and stratified sand and gravel. Consists of ice-contact delta deposits graded to the contemporary sea. Distinguished by flat top (sometimes kettled) and foreset-topset beds. Thickness varies from 0.5 to 30 m (1 to 100 feet). Two deltas have been assigned the unique geographic names listed below:

Pmdigl - Gracelawn delta; topset-foreset contact at elevation 336 feet (102 m). (Thompson and others, 1989)
Pmdia - Armory delta

Pp — **Presumpscot Formation: Glaciomarine bottom deposits** (Pleistocene) - Silt and clay with local sandy beds and intercalations. Consists of late-glacial fine-grained (marine mud) bottom deposits. Commonly lies beneath surface deposits of units Pmdi, Pm, and Pmrs; in places, may be coated with unmapped thin dune deposits. As much as 50 m (150 ft) thick.

Pge — **Esker deposits** (Pleistocene) - Sand and gravel deposited by glacial meltwater flowing in tunnels within or beneath the ice. As much as 21 m (70 ft) thick.

Pt — **Till** (Pleistocene) - Light- to dark-gray, nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders; a predominantly sandy diamicton containing some gravel. Generally underlies most other deposits. Thickness varies and generally is less than 6 m (20 ft), but is probably more than 30 m (100 ft) under many drumlins and streamlined hills. Many streamlined hills in this area are bedrock-cored.

Bedrock exposures - Not all individual outcrops are shown on the map. Gray dots indicate individual outcrops; ruled pattern indicates areas of abundant exposures and areas where surficial deposits are generally less than 3 m (10 ft) thick. Mapped in part from aerial photography, soil surveys (McEwen, 1970), and previous geologic maps (Prescott, 1968).

>>>>> **Esker crest** - Chevron points in inferred direction of meltwater flow.

Direction of meltwater or meteoric water flow over outwash, alluvium, or till deposit.

Direction of dip of cross-bedding - Arrow shows average dip directions of cross-bedding in fluvial or deltaic deposits, which indicates direction of streamflow or delta progradation. Point of observation at tip of arrow.

135 **Glacial striation** - Point of observation is at dot. Arrow shows ice-flow direction inferred from striations on bedrock. Number is azimuth (in degrees) of flow direction.

135 **Older glacial striation**, where there is more than one.

135 **Oldest glacial striation**.

Ice margin position - Line shows an inferred approximate position of the glacier margin during ice retreat, based on positions of meltwater channels, moraines, and/or heads of ice-contact deposits.

Moraine ridge - Line shows inferred crest of moraine ridge deposited at the glacier margin.

Drumlin form or streamlined hill. Symbol is parallel to direction of glacial ice movement.

Contact - Boundary between units, approximately located.

Area of many large boulders, where observed - May be more extensive than shown.

K **Kettle hole** - depression left by melting of glacial ice.

REFERENCES

McEwen, B. W., 1970, Soil survey of Androscoggin and Sagadahoc Counties, Maine: U. S. Department of Agriculture, Soil Conservation Service, 83 p., scale 1:15,840.

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Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Anderson, B. G., 1989, Glaciomarine deltas of Maine and their relation to Late Pleistocene - Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr., (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Hildreth, C. T., 2002, Surficial geology of the Lewiston 7.5-minute quadrangle, Androscoggin County, Maine: Maine Geological Survey, Open-File Report 02-164, 6 p.
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3. Neil, C. D., 1999, Significant sand and gravel aquifers of the Lewiston quadrangle, Maine: Maine Geological Survey, Open-File Map 99-22.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print).
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.